



ATCF 5.0 and Related Applications

Presenter

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Contributors

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Jim Goerss and Jim Hansen (NRL)

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Overview

Infrastructure

- **ATCF 5.0**
- **Flat File Database**
- **Web-ATCF**

Objective Aids

- **Track Consensus**
- **Intensity Aids, Intensity Consensus**
- **GPCE, GPCC, GPCE-AX**
- **New Wind/Central Pressure Relationship for Bogus**

JTWC Client Products

- **JTWC/WW3**
- **Wind Probabilities**
- **Experimental TC-COR Settings**
- **GIS Products**

Publications



JTWC Forecast Process



1500 UTC Watch Turnover

1800 UTC Start 1800 UTC Warning

A

T

C

F

2030 UTC Issue 1800 UTC Warn

2200 UTC Prog Reasoning

Warning Crunch

0000 UTC Start Over

Update BT

Send Bogus

Create Consensus

Track Analysis

Intensity Assessment

Create Warnings

Issue Warnings

Customer Calls

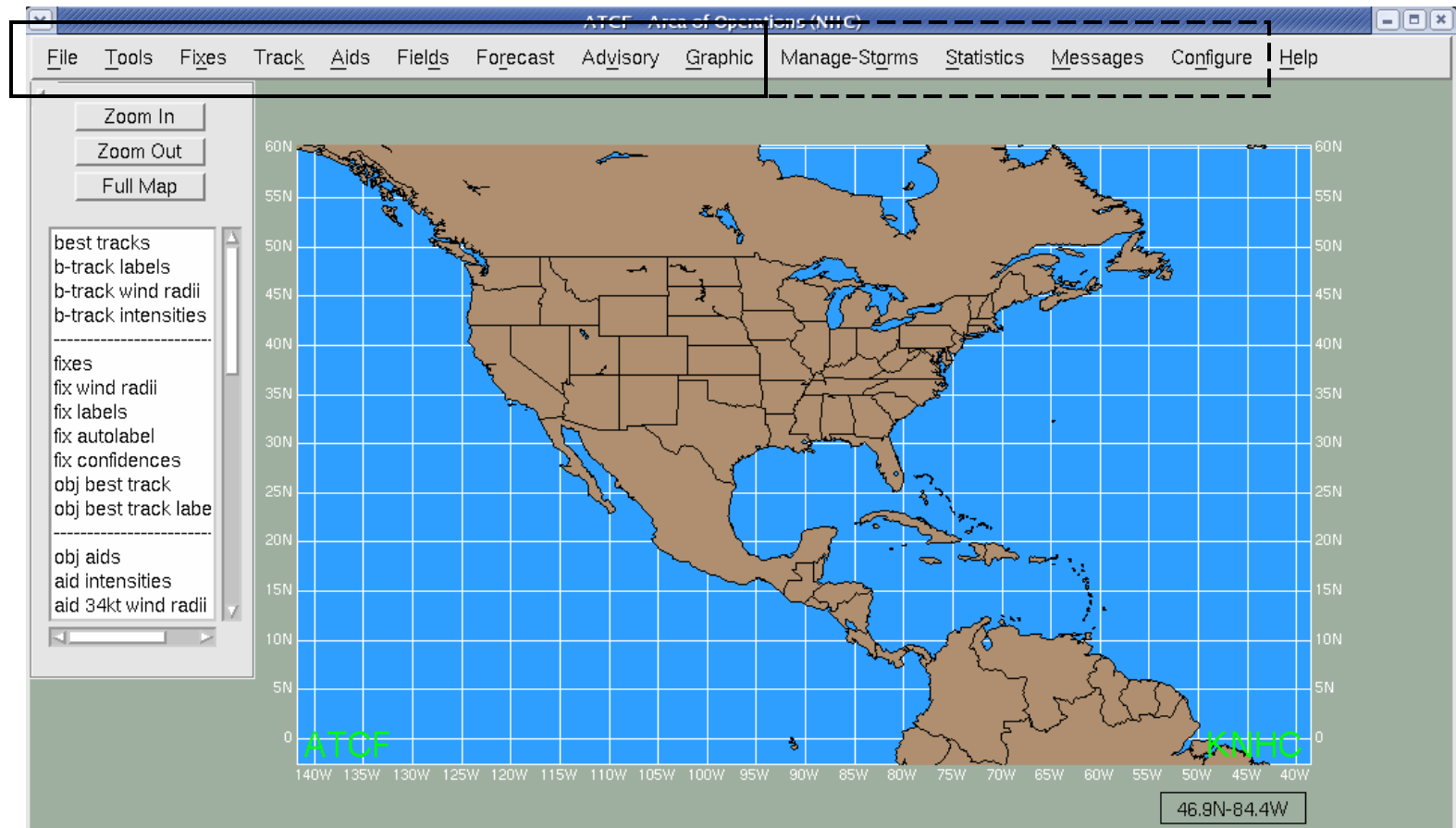
TIME IS THE ENEMY

Storm Display Window

"main menu is eliminated"

Storm Display Menu
Options ↓

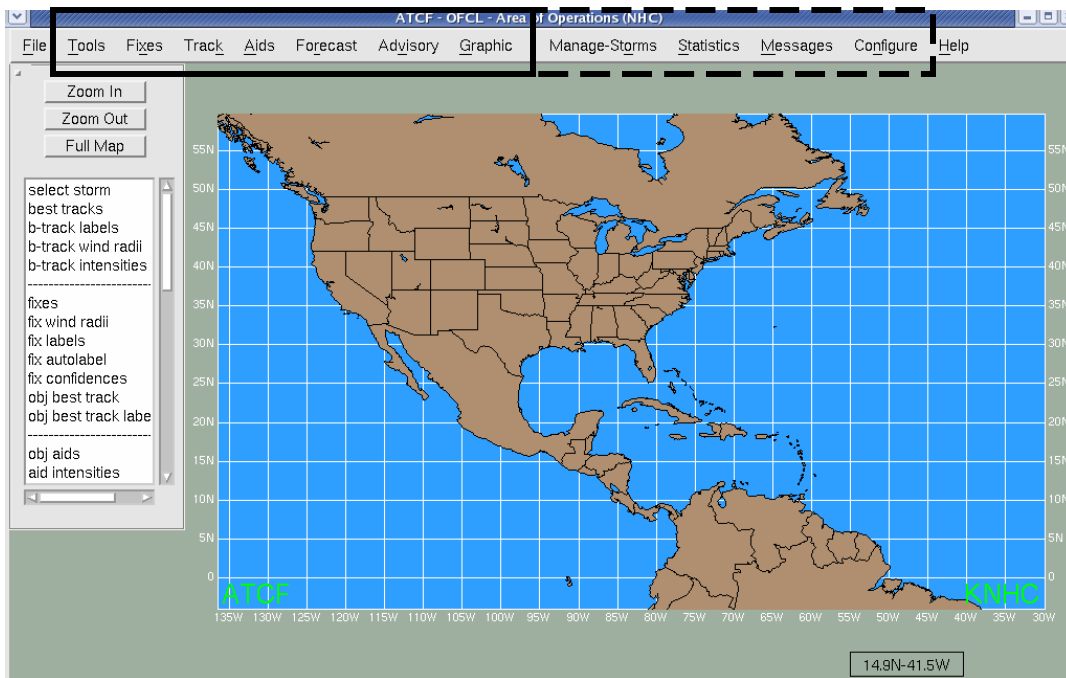
Main Menu
Options ↓



Single Storm Display Window

Typical Forecast
Process

Manage storms, do stats,
etc.

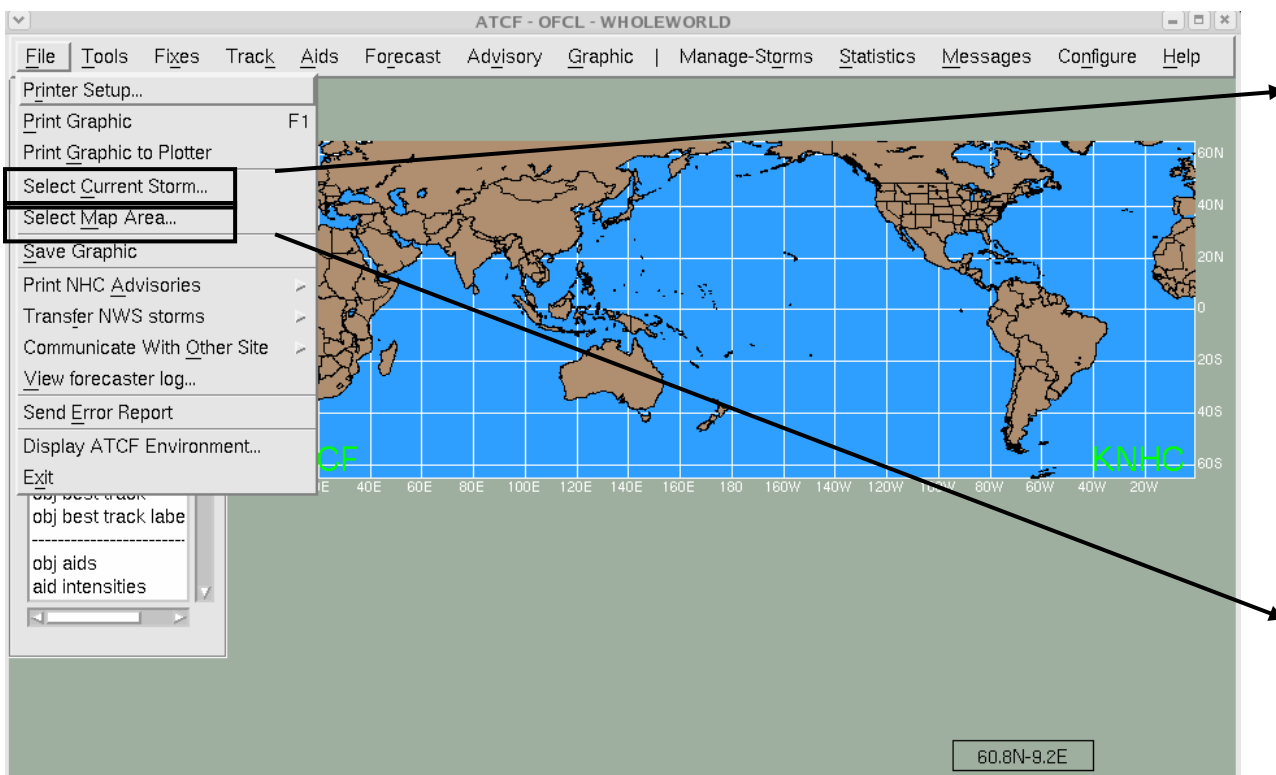


- Storm specific functions (left side)
- Previous main menu functions are now on the right (past the separator)
- User can have multiple windows open if required

“Purpose is to combine all functionality into one display for web ATCF functionality (same code base).”

Storm or Map Area Selection

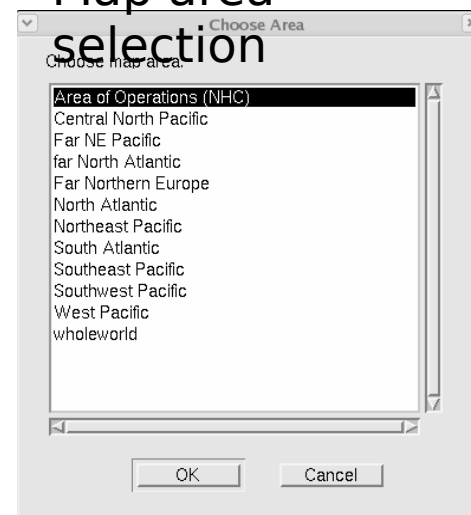
“new changes to the display window”



Storm section dialog



Map area selection



“When initially started, the map area loads to a default domain”

New ATCF Flat File Database

1. Replaces TEDS at JTWC

2. Fed data by CAGIPS at FNMOC

3. Grids

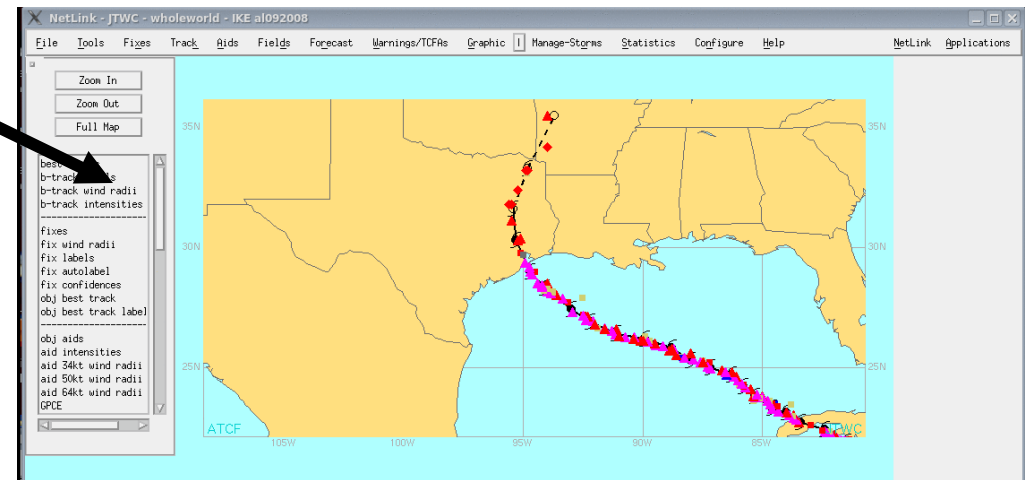
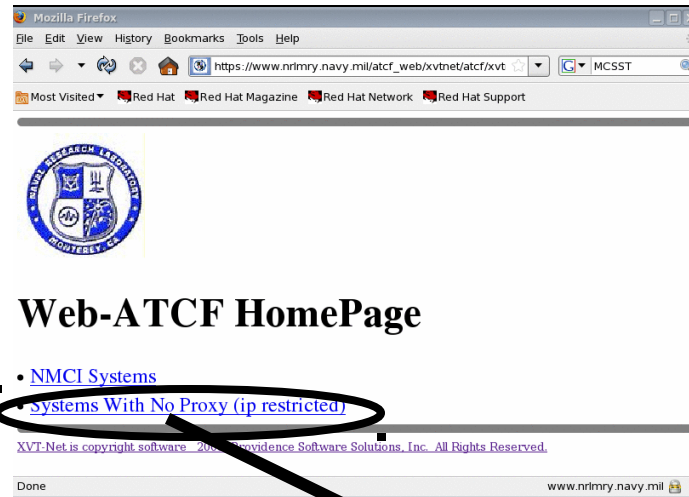
- **NOGAPS, GFS, UKM, COAMPS-WP, JMA
Global**

4. Observations

- **A/C Wind Reports, Feature Track Winds**
- **Scatterometer Reports, Synoptic Reports,
Buoys**
- **RAOBS, Altimeter Sig Wave Heights**

Web-ATCF Demo

www.nrlmry.navy.mil/atcf_web/xvtnet/atcf/xvtnet.html



CAC-Enabled Demo

IP Protected Demo

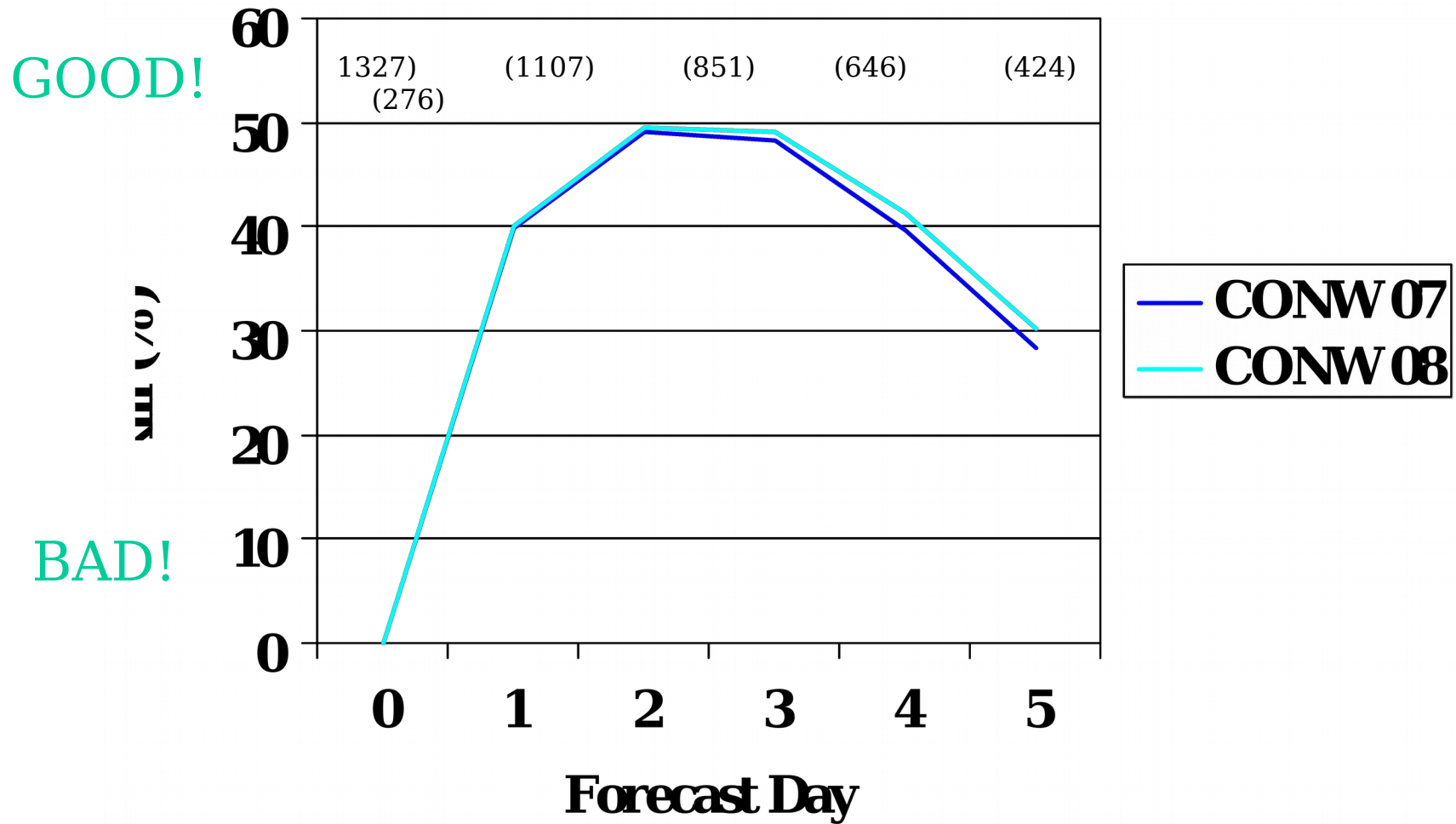
Providence, SAIC, NRL

NHC Implementation of Web-ATCF



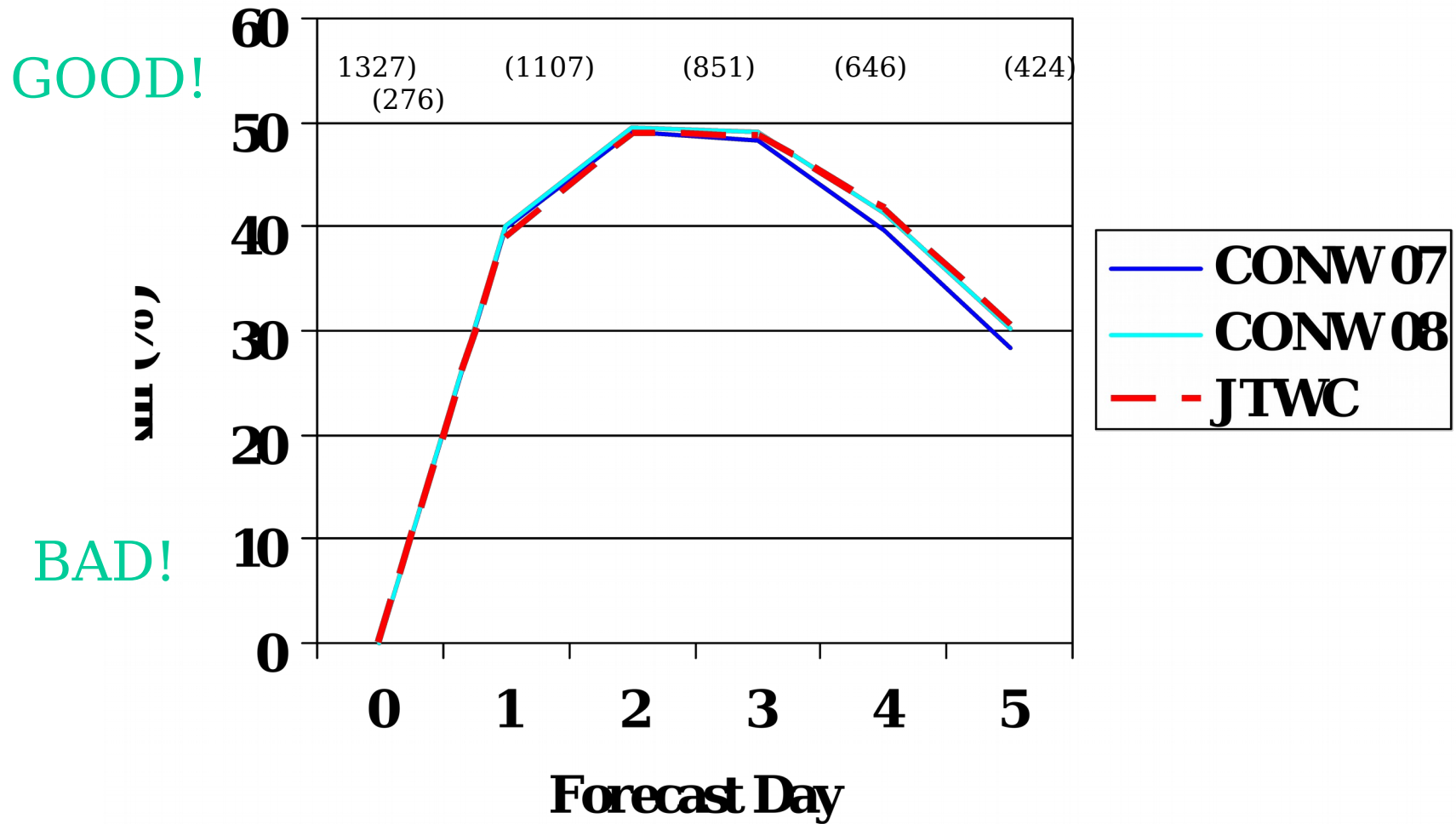
In the NHC implementation, the forecaster uses an ATCF server (with a hot spare), and all the NWS offices on the conference call access the Web-ATCF. Used for displaying aids, fixes, forecasts ...

WP Track Consensus Improvement



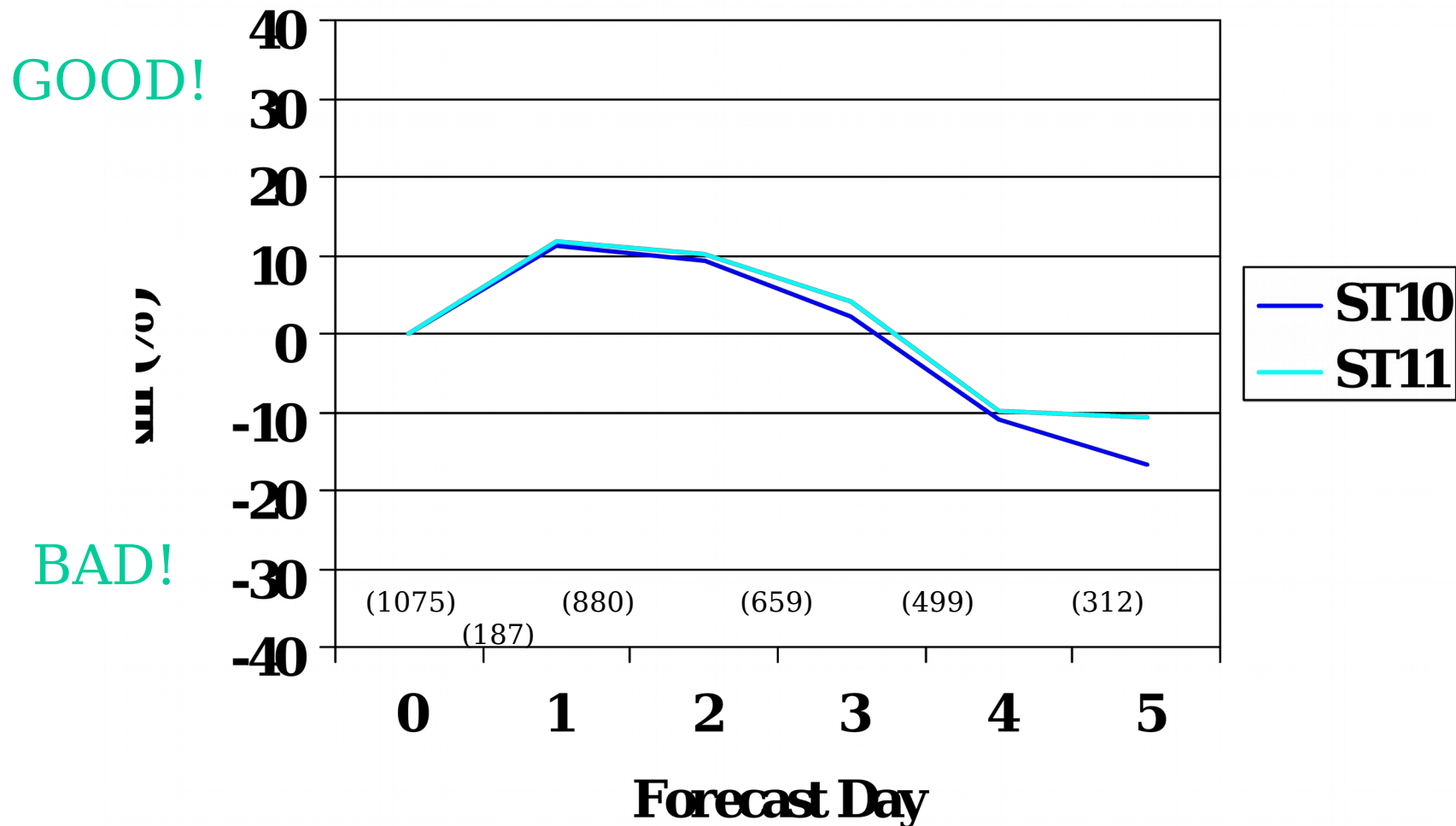
ECMWF model is now used for most consensus forecasts (CONW 08). In CONW 07 it was only used every other forecast due to latency. WP 2006-2008 (wp23) used in study. Skill is measured with

WP Track Consensus Improvement



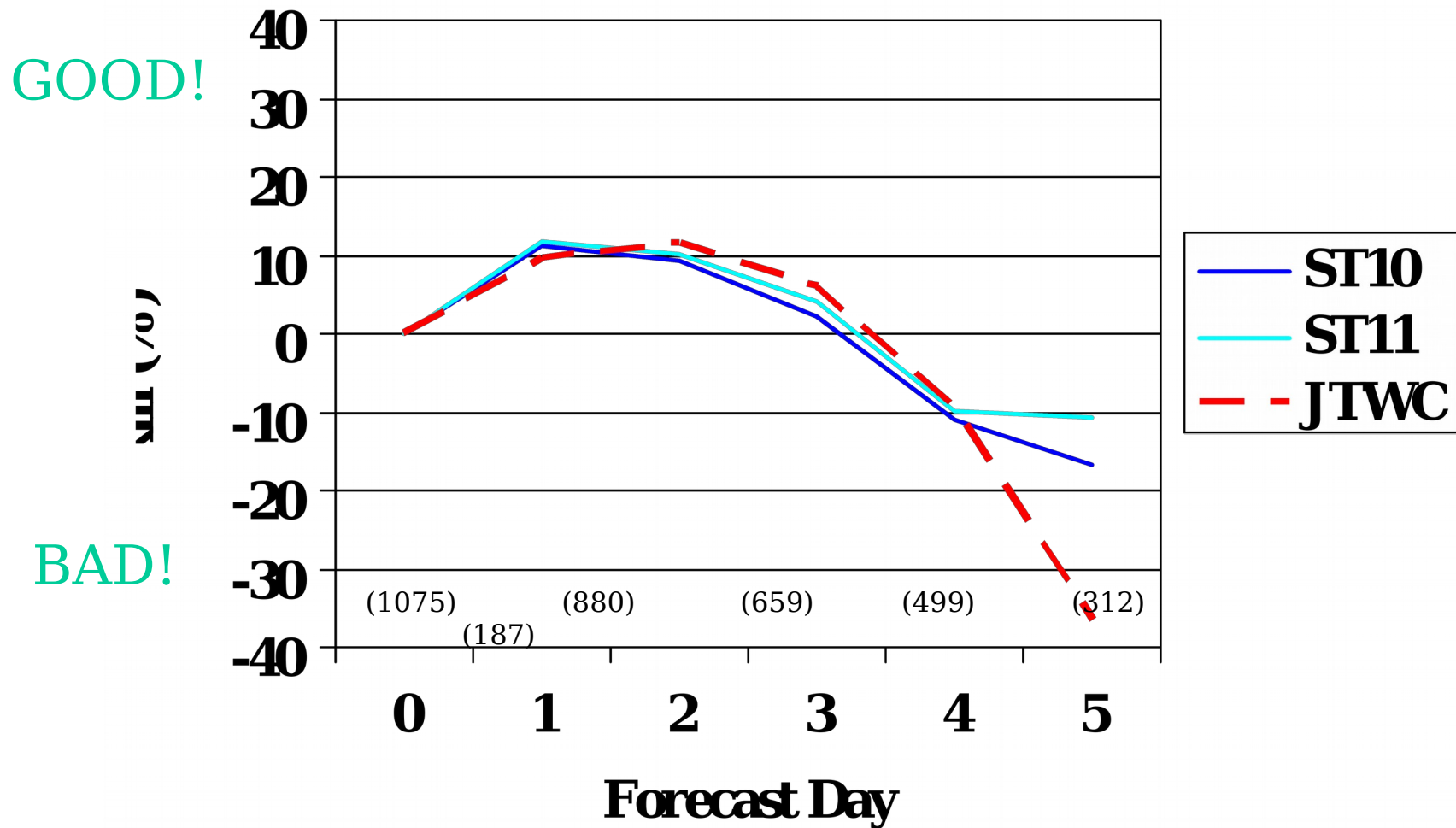
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WP Intensity Skill Improvement



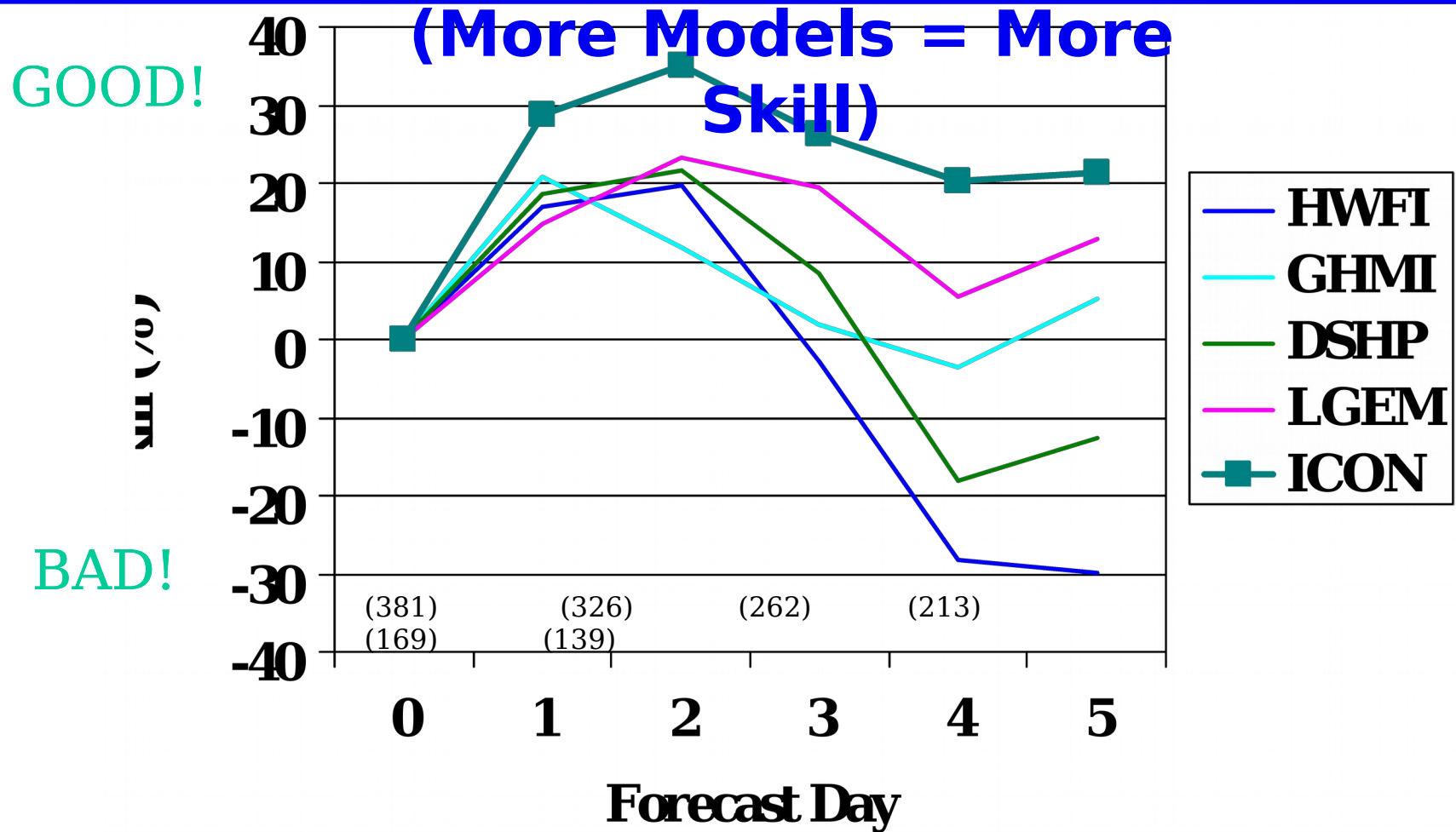
Top-performing intensity aids have skill to three days. ST10 is a STIPS ensemble,
 ST11 = STIPS ensemble members + GFDN. GFDN has NCEP, NRL

WP Intensity Skill Improvement



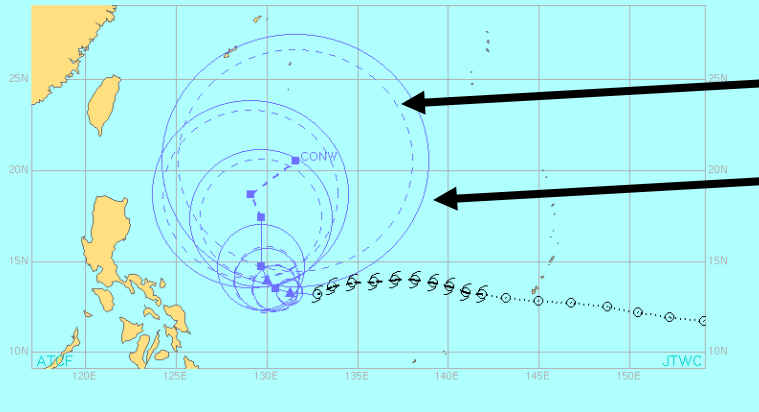
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2008 Atlantic Intensity Skill



The four top-performing intensity models and their average (ICON). The consensus generally outperforms individual models. If more skilful models in the WP, forecast skill would improve! NCEP, NCEP, NESDIS

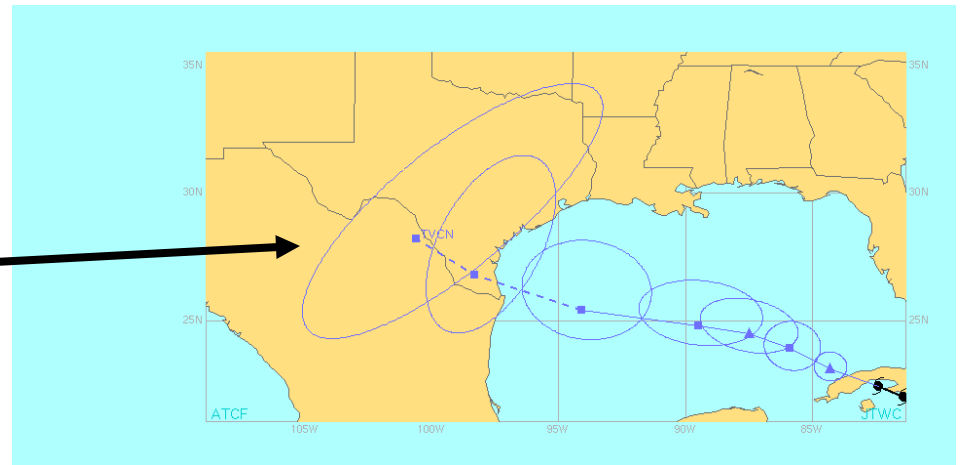
Goerss Predicted Consensus Error (GPCE, GPCC, and GPCE-AX)



GPCC (WP, AL, EP)

GPCE (WP, AL, EP, SH)

GPCE-AX
(AL only)

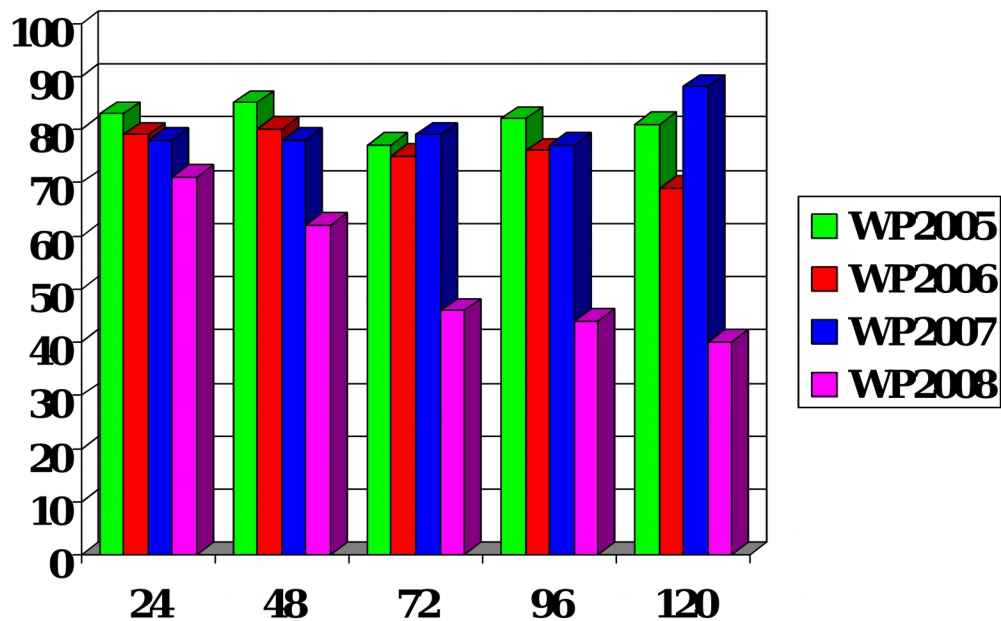


GPCE predicts the 70th percentile for each forecast period based partly on consensus spread, GPCC is a three-year average GPCE, and GPCE-AX is a set of ellipses based on cross and along track

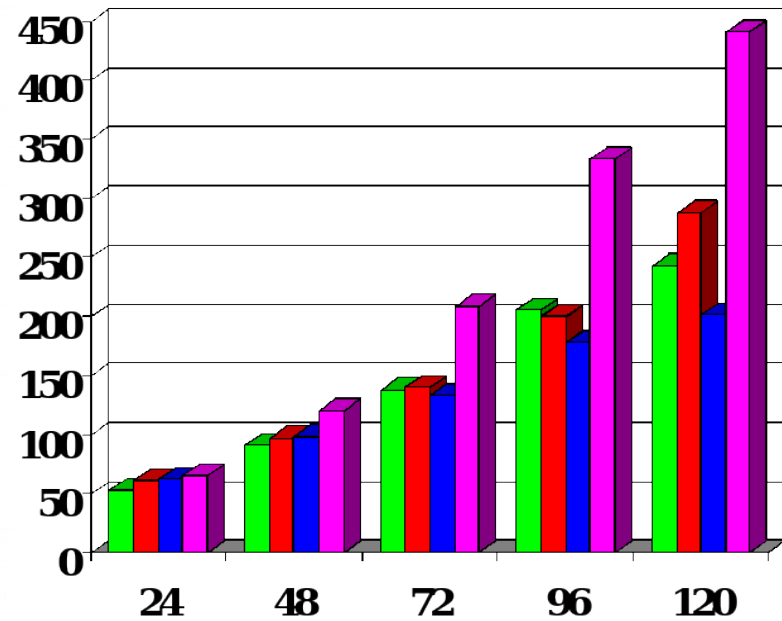


GPCE Validation 2005-2008 Western North Pacific

GPCE Validation (Percent)



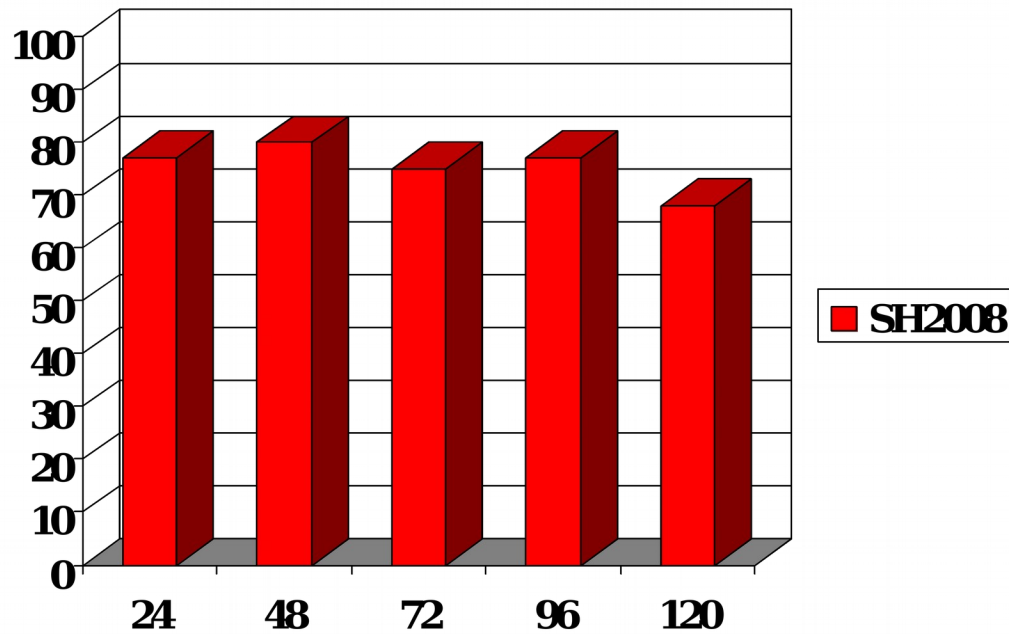
CONW Forecast Error (nm)



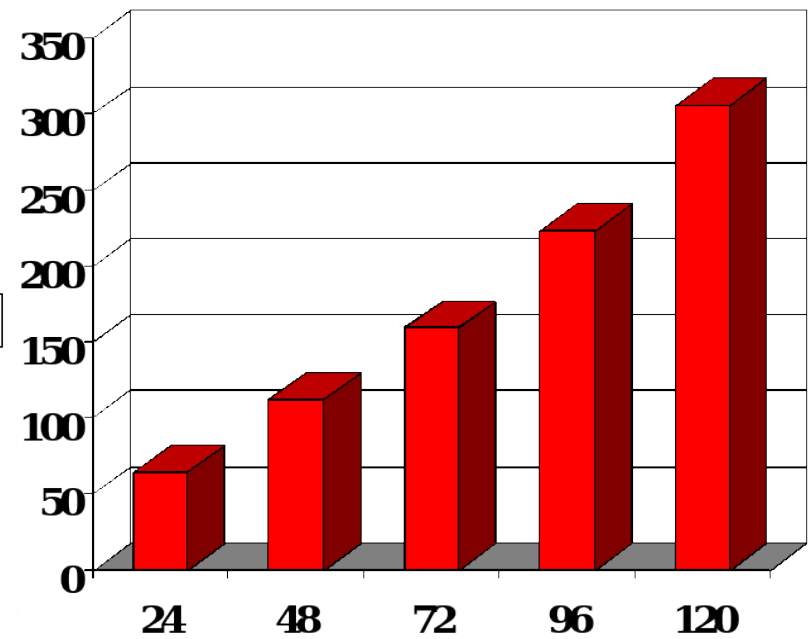


GPCE Validation 2008 Southern Hemisphere

GPCE Validation (Percent)



CONW Forecast Error (nm)



New ATCF Wind/Pressure Relationship

Prepare Compute Data - CORTEST wp862009

88 2003 Northwest Pacific - CORTEST

Date-Time-Group: 2008050706

	Lat (deg)	Lon (deg)	Max Wind (kt)	Dir (deg)	Spd (kt)
Pas: 24 h:	20.4	128.4	E	75	
Pas: 12 h:	22.3	128.3	E	80	342
Current:	25.3	128.2	E	90	14

Eye Diameter: 30 rm

Max Wind Radius: 15 rm

Vertical Extent of Circulation: Shallow <700 mb

Central Pressure: 372 mb

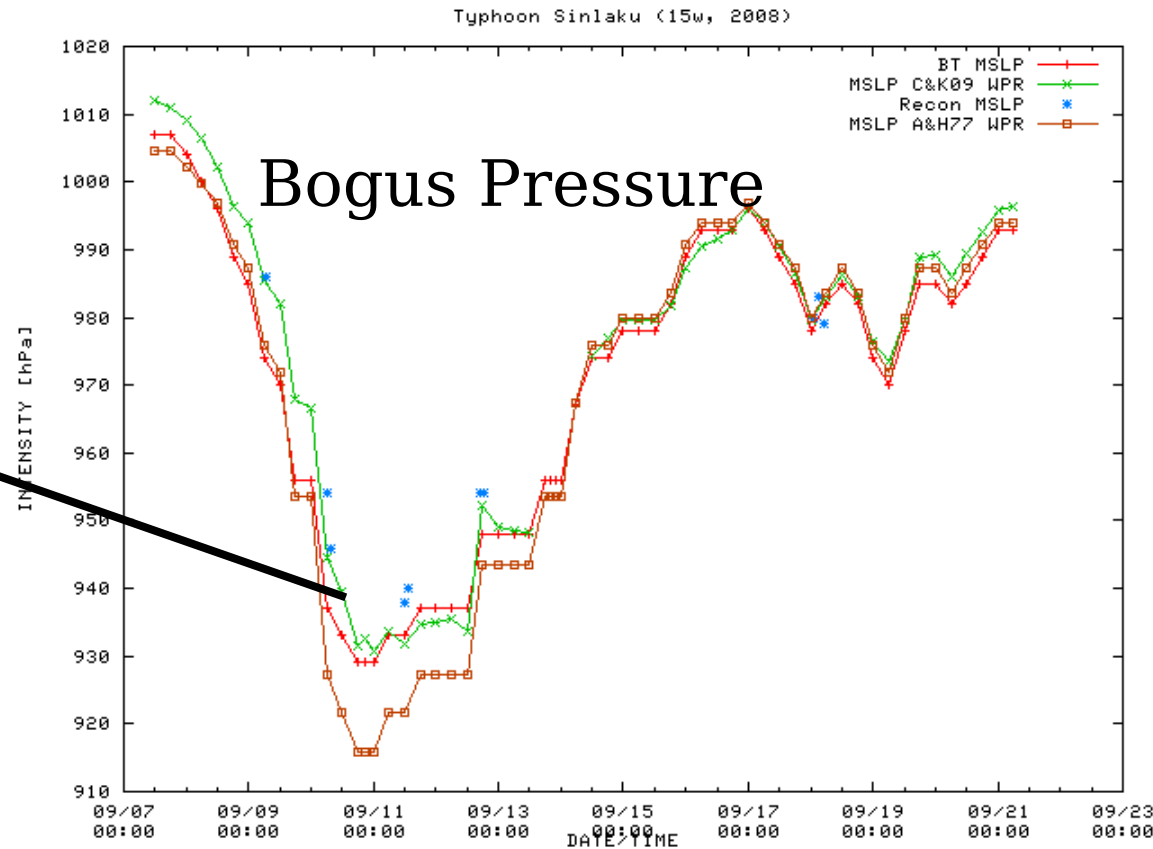
Outermost Closed Isobar: 1004 mb

Radius Outermost Closed Isobar: 150 rm

Speed/Quadrant:

	NE (nm)	SE (nm)	SW (nm)	NW (nm)
34 kt:	100	100	100	100
50 kt:	50	50	50	50
64 kt:	20	20	20	20

Help OK Cancel

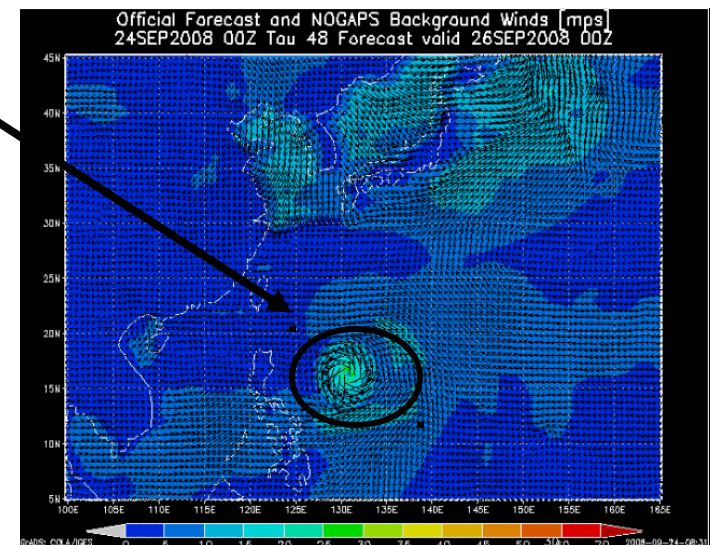
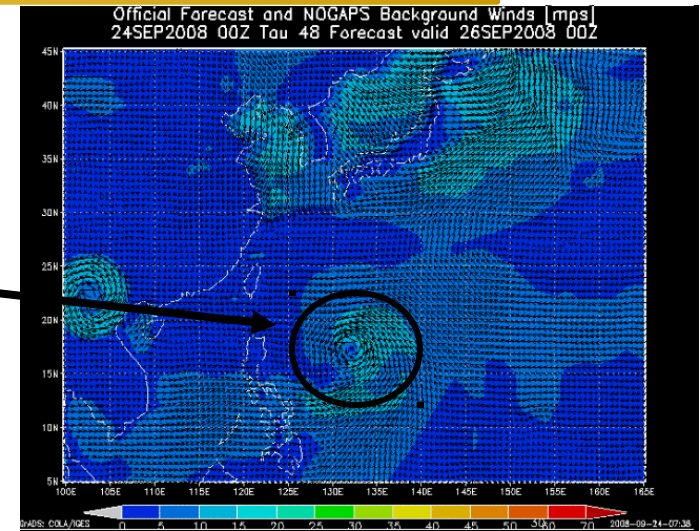


ATCF Bogus Dialog

New maximum surface wind vs pressure relationship to aid in creating a more realistic bogus for other applications (e.g., NWP models). The latest relationship (2009) depends on six subs, BoM,

JTWC Wavewatch III (JTWC/WW3)

1. Obtain model sfc winds
2. Cut out model vortex
3. Generate JTWC vortex
4. Insert JTWC vortex
5. Run WW3

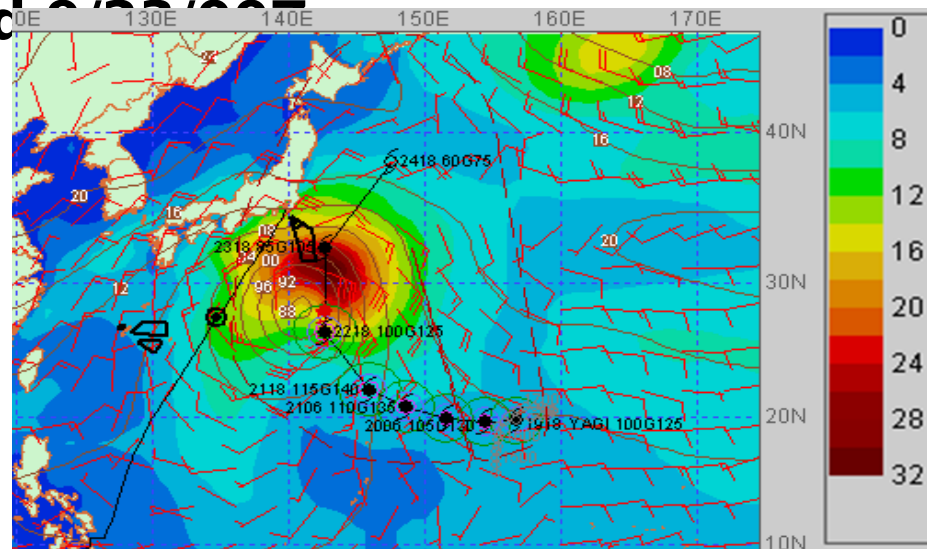


JTWC/WW3

Yagi Sortie Case

9/19/18Z

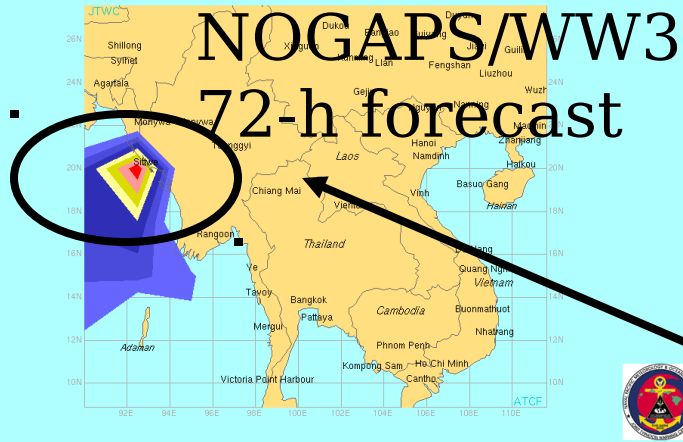
- Ships sortied from Yokosuka based on this forecast valid 9/19/06



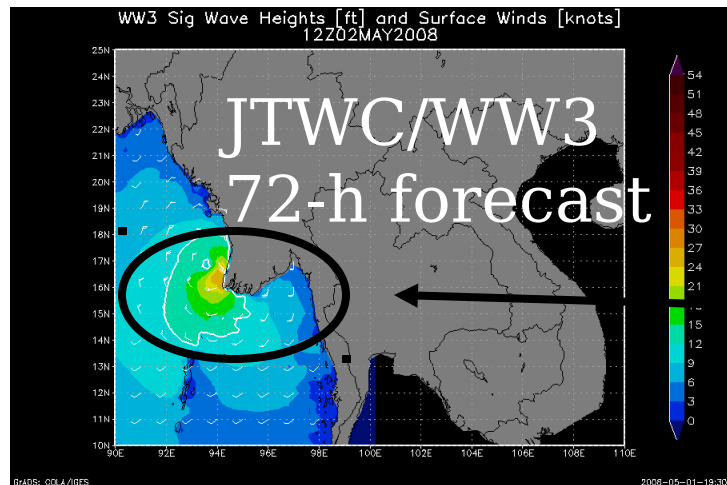
- What about JTWC/WW3? Yagi 9/19/06

NARGIS (IO012008)

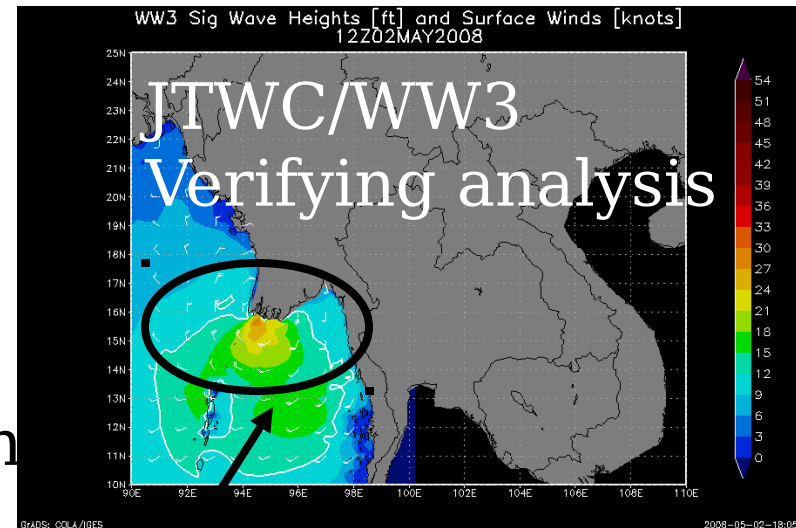
2008 04 29 12Z 72-hr Forecasts



Bangladesh



Myanmar



NOGAPS/WW3 72-h forecast has high waves far north of the JTWC/WW3 forecast. Inconsistent forecasts are difficult to brief to operators. FNMOC, NRL

JTWC/WW3 Website

(www.nrlmry.navy.mil/atcf_web/wavewatch)

1. 2009 Season

- **Near real-time runs at NRL (00 and 12 UTC)**
- **Done at +12 h**
- **Gifs, Animated Gifs**
- **Shape files of 12 ft seas (courtesy FNMOC)**
<ftp://ftp.nrlmry.navy.mil/pub/receive/sampson/WW3/SHAP>
E/

2. 2010 Season Plans

- **Transition to FNMOC**
- **Multi-storm capability**

EXPERIMENTAL TC-COR SETTINGS

SITE TC-COR

Atsugi 4

Camp Fuji 3

Camp Zama 4

Iwakuni 3

Kadena AB 1

Narita Airport 4

Pusan 3

Sasebo 2

Tokyo 4

Yokosuka 4

Yokota AB 4

Yokohama 4

*** BASED ON JTWC WARNING NR 020 FOR TYPHOON 88W

NOTES:

TC-COR SETTINGS ARE BASED ON RELATIONSHIP BETWEEN
PROBABILITIES IN THE ATLANTIC AND GULF OF MEXICO.

THEY ARE OBJECTIVE GUIDANCE FOR ONSET OF 50 KT WINDS AT NAVY INSTALLATIONS.

EACH SITE HAS ITS OWN SENSITIVITIES, WHICH THESE TC-COR SETTINGS DO NOT ADDRESS.

THE FOLLOWING CUMULATIVE PROBABILITIES ARE USED FOR THE TC-CORR THRESHOLDS:

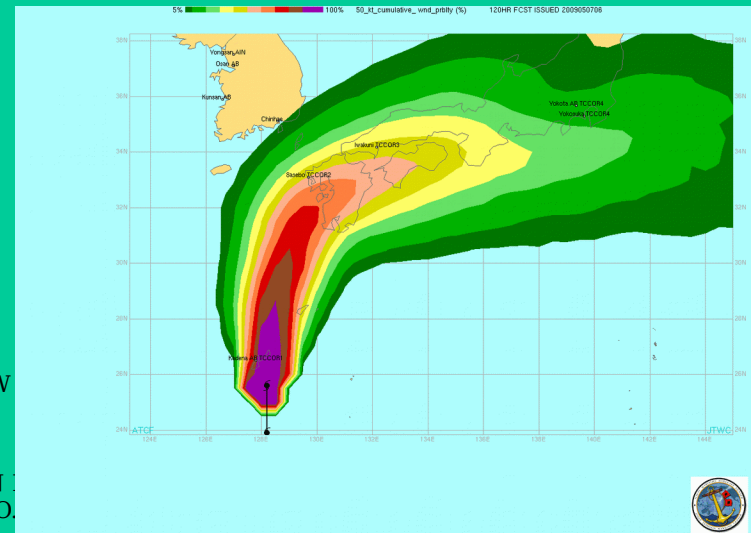
TC-COR4 5% PROBABILITY OF 50 KT AT 72 H

TC-COR3 6% PROBABILITY OF 50 KT AT 48 H

TC-COR2 8% PROBABILITY OF 50 KT AT 24 H

TC-COR1 12% PROBABILITY OF 50 KT AT 12 H

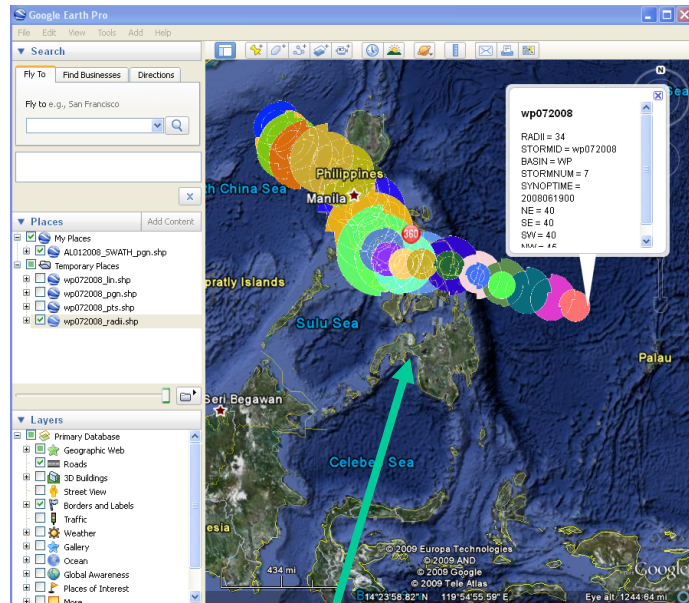
END OF EXPERIMENTAL TC-COR SETTINGS





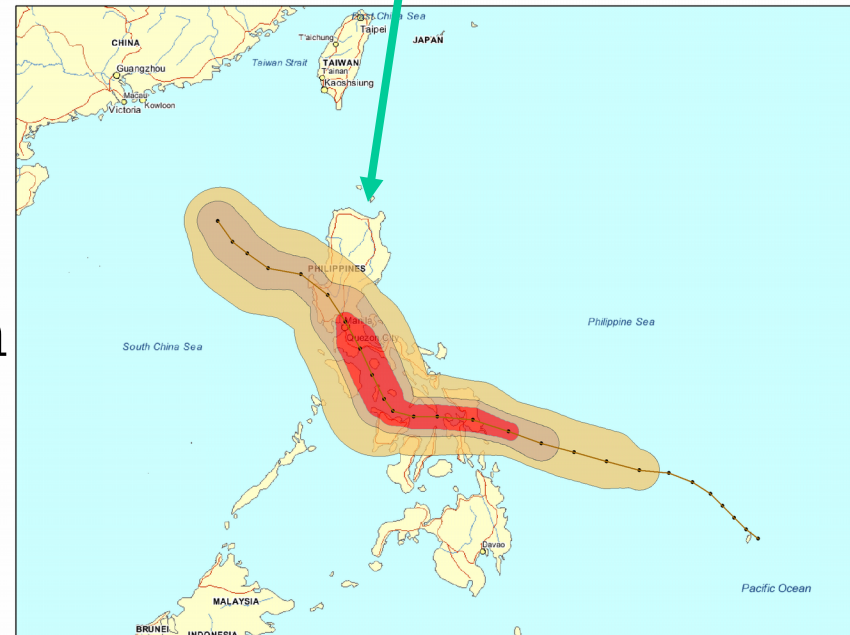
Shapefiles for GIS Systems

(Experimental for 2009)



Wind Radii on Google Earth

Wind Swath on ArcGIS



Publications

DeMaria, 2007: Sampson, C. R., J. L. Franklin, J. L., J. A. Knaff and M.
intensity consensus. *Wea. And Forecasting*, 23, 304-312.

Bringas, F., Sandery, P., Ramos-Buarque, and Halliwell, G. 2008. Goni, G., DeMaria, M., Knaff, J., Sampson, C., Ginis, I., Mavume, A., Lauer, C., Lin, I., Ali, M., S., Kang, K., Mehra, A., Chassignet, E.
derived ocean measurements to tropical cyclone intensity forecasting, Final GODAE Symposium 2008, Nice, France.
[Available on-line from <http://www.godae.org>].

tropical Warning Sampson, C. R., and J. A. Knaff, 2009. **Southern Hemisphere cyclone intensity forecast methods used at the Joint Typhoon Center, Part III: Forecasts based on a multi-model consensus approach. *Aust. Met. Mag.*, in press.**

tropical Warning approach. Knaff, J. A., and C. R. Sampson, 2009. **Southern Hemisphere cyclone intensity forecast methods used at the Joint Typhoon Center, Part II: Forecasts based on a statistical-dynamical *Aust. Met. Mag.*, in press.**

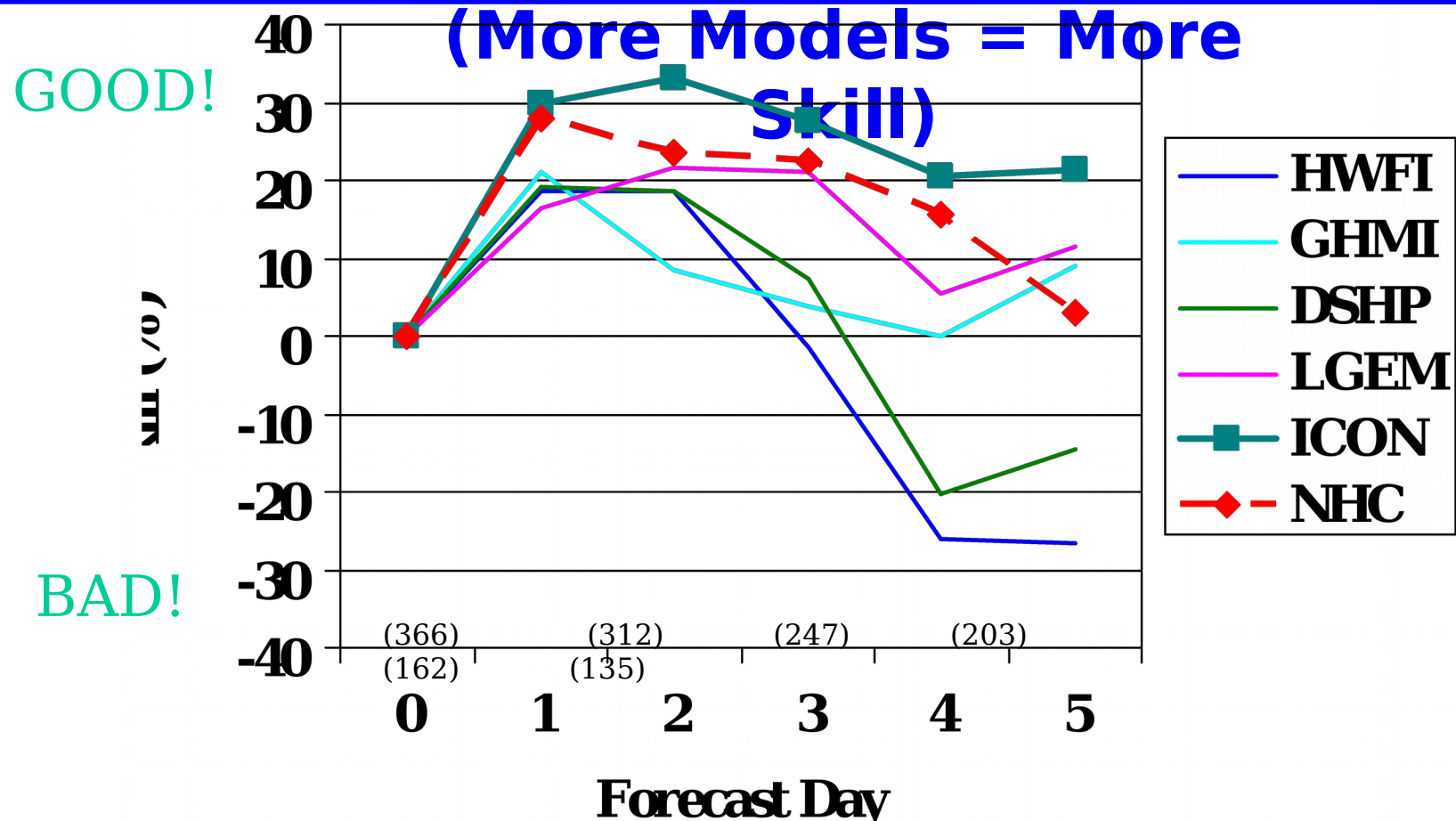
tropical Warning persistence. Knaff, J. A., and C. R. Sampson, 2009. **Southern Hemisphere cyclone intensity forecast methods used at the Joint Typhoon Center, Part I: Control forecasts based on climatology and *Aust. Met. Mag.*, in press.**

R. T. DeMaria, M., J. A. Knaff, R. Knabb, C. Lauer, C. R. Sampson,
DeMaria, 2009: A new method for estimating tropical cyclone wind speed probabilities. **NCDC, NRL, NHC, AOMI.**



Questions?

2008 Atlantic Intensity Skill



The four top-performing intensity models and their average (ICON). The consensus generally outperforms individual models. If more skilful models in the WP, forecast skill would improve! LGEM, TC-COAMPS, ...

NRL, NHC, NESDIS